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Leading Articles

Heavy Loss of Cattle from the Effects of Oesophagostoma Inflatum*

By D. F. LUCKY, State Veterinarian, Missouri

Heretofore very little importance has been attached to the worm Œsophagostoma Inflatum. Practically none of the authorities on parasites have admitted that this worm is capable of producing fatal disease among cattle. In fact, it has been practically overlooked by all authorities on parasites, except Dr. B. F. Kaupp, who gives a good description of it with cuts on pps. 118–121 of his book on "Animal Parasites."

A marked example of the effects of this worm was shown in a lot of cattle consisting of 102 head of short yearlings shipped to southeast Missouri in February, 1910, for grazing purposes. An examination of this herd was made on September 15, and twenty-two head were dead and the twenty-third was killed for postmortem purposes. All of the balance of the yearlings were in a very poor condition. After arrival in southeast Missouri in February, this lot was given plenty of roughness that would ordinarily carry it through in good shape until spring. These cattle had access to good pasture with plenty of red clover throughout the summer.

*Read at the Fourteenth Annual Meeting of the United States Live Stock Sanitary Association, Chicago, Dec. 5, 6 and 7, 1910.

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The history of the herd and the postmortem examination left no room for doubt about the cause of the trouble.

This outbreak called to mind a large number of similar outbreaks in the state of Missouri in the spring of 1904. So many complaints of calves and yearlings dying of scours during the winter of 1903 and 1904 reached the office that a systematic investigation was made, covering six counties. Postmortem examinations were made on one or more animals in almost every infested herd. These examinations were so complete as to leave no room for doubt but that the Œsophagostoma Inflatum was the sole cause of the extreme emaciation and of death in many cases. In one outbreak in a herd of thirty-six head in Jasper County, twenty-three head died and the remaining thirteen, mostly cows, were left in a very poor condition. One outbreak in Grundy County in a herd of 320 head of grade and full-blood Aberdeen-Angus cattle, resulted in the death of eighty-three head. In one neighborhood in Gentry County forty different farmers had cattle affected with this worm, and lost by death from one to thirty-four head each. The amount of the loss from the emaciation of the cattle that lived was equal to the loss by death.

Contagion.—In all of the outbreaks in the larger herds, the disease was definitely traceable to some infested animal getting into the pasture or being added to the herd. In order to demonstrate that this worm spreads quite rapidly from one animal to another, two diseased heifers were shipped from King City to the State Farm, Columbia, Missouri, arriving May 27, 1904. These heifers were placed upon a small grass lot with six other heifers which were supposed to be free from infestation. A postmortem on one of the six on July 25 following showed the presence of some of the mature worms in the cæcum and a few of the submucous cysts which invariably accompany infestation of this worm.

Symptoms.—The symptoms vary greatly according to the age of the animal and the kind of feed used. While a number of mature animals succumb to the disease, death was mostly among yearlings and under. A herd of cattle on a good grain ration seldom showed much effect from the worm, while among the cattle carried through the winter on roughness alone, the death-rate was heavy. The mildest symptom shown by any cattle was a slight loss of condition. The only thing noticeable was that they required more feed than usual, and in many cases with all the feed they could eat they still remained in poor condition. In some cases emaciation, which gradually increased in the course of from eight to twelve weeks, became extreme in the end and resulted in the death of the animal. In most cases there was extreme diarrhea, setting in from five to fifteen days before, and continuing to the death of the animal. A dropsical swelling was very common in the last stages. The appetite was good throughout. An infested herd, as a rule, showed more evidence of the presence of this parasite during the winter when on dry feed than in summer when on good pasture. The severe loss in the herd in southeast Missouri during the past summer may be attributed to the fact that there

was considerable rain and the grasses and clover contained more water than usual. Thus the pasturage was of poor quality and the animals less able to withstand the parasite than they are when on nutritious feed.

Autopsy.—The postmortem examination on a badly affected animal, of course, showed extreme emaciation. An ordinary postmortem examination would reveal nothing further. However, a close examination of the contents of the cæcum and colon revealed the presence of the worm. In cases where extreme diarrhea had prevailed the most of the mature worms had been expelled and very few were to be found. In the cases where death was not preceded by the diarrhea, immense numbers of the worms were found. In all cases there was found beneath the mucous membrane of the cæcum and colon a peculiar cyst containing an embryo worm, visible under a low power glass, and a small amount of yellowish, cheesy pus. These cysts vary from those of the œsophagostoma Columbianum in that they are found on the inside of the guts instead of the outside and in that their contents are of a yellowish cast instead of greenish. In some cases the cysts were so numerous that the entire wall of the cæcum and colon were studded with them sufficiently to interfere largely with the absorption of nutriment. In some cases the small number of mature worms and cysts in no manner corresponded with the grave symptoms shown by the animal and the indications are that there was toxemia. It is possible that the obstruction of the absorption of food by the cyst does as much to reduce the strength of the animal as the sucking of blood by the mature parasite.

Life History.—The life history of this worm in unknown. It has been partially demonstrated that an infested animal will spread the parasites to others within sixty days and that the life-cycle may cover less time. The cyst and the mature worm always occurring together indicates beyond reasonable doubt that the embryo found in the cyst and the mature worm are related to each other. It is impossible to say whether or not this worm propagates in the intestinal tract.

Treatment.—The most important thing by way of treatment is to immediately give an infested lot of cattle plenty of nutritious feed and to avoid further use of infested pastures. We used as a preventative a conditioning powder containing sulphate of iron, sulphate of copper and common salt. In many badly affected animals very satisfactory results were secured by fasting the animal twenty-four hours, and then giving a cathartic and following with a full dose of gasoline and sweet milk. It was impossible to follow up the results closely enough to determine just what course of treatment is best to pursue.

There is no doubt but that this worm is quite widespread in nature and that, when suitable conditions arise, it will cause a lot of damage among cattle. The heaviest losses were noticed following cool, rainy summers and among cattle which were roughed through the winter instead of being given plenty of nutritious food.

Evolution of Antisepsis*

By A. O. LONGLEY, D. V. S., Fresno, California

This ideal action cannot be obtained in the use of the old line of antiseptics, as the following brief outline of their actions will show. Most of them depend upon their power to coagulate albumen, thus attacking the cell tissue and the microorganisms at the same time, and are also caustic or toxic, or both.

Carbolic Acid is caustic and irritating, coagulates albumen and is non-penetrating because of the film of coagulated albumen formed over a denuded surface. After entering into insoluble compounds with albumen its antiseptic action is lost.

Mercuric Chloride also coagulates albumen, but this may be prevented by the addition of tartaric acid. Its use as an antiseptic in surgery is limited because of its corrosive action upon metallic instruments.

Potassium Permanganate is slightly caustic but non-toxic and depends for its antiseptic action upon its power to part with oxygen when brought in contact with organic tissue. This action is exceedingly rapid and transient.

Formaldehyde is a powerful germicide but is irritating and painful. It tumifies animal tissue, thereby interfering with the process of healing.

Iodine.—Much has been said and written of late of the virtues of tincture of iodine in rendering an operative field aseptic. It is an irritant but apparently does not interfere with wound healing. As a germicide its action is good in some cases, but as an antiseptic in surgery its usefulness is lessened by its cost and its staining of the operator's hands.

Red Mercuric Iodide has an antiseptic action equal or superior to the chloride of mercury and if made into an aqueous solution of the strength of 1 : 2000 to 1 : 5000 to which has been added one percent of sodium bicarbonate, a very effective, non-irritating antiseptic is obtained which has no action on metallic instruments. Of the old line of antiseptics, thus modernized, it is nearest to a perfect antiseptic, although it is not non-toxic. The sodium bicarbonate has an action similar to soap in cleansing a surface or cavity in that it assists in dissolving fatty material and is superior to soap as it tends to liquefy pus.

The use of antiseptic solutions that are too strong, thereby producing a caustic effect and resulting in an irritated or congested surface, only offers a more suitable field for bacterial growth. True, the application of antiseptics by the veterinarian must necessarily be strong, because of the necessity of operating in infected surroundings, such as a stable, barn yard or in an operating room containing many kinds of infection. But the antiseptic, besides being strong and effective, should be non-caustic and non-toxic.

Water, especially warm water, is a good disinfectant, but falls far short of being an antiseptic, but the addition thereto of some non-toxic,

*Continued from page 336 of December issue of VETERINARY MEDICINE.

non-irritating substance, having power to destroy or arrest the multiplication of microorganisms, adds materially to its usefulness.

The old line of antiseptics can rarely be used in such strength as to kill all microorganisms without injuring or destroying the host. This bears out the need of a non-toxic, effective antiseptic, one that meets with modern requirements. We must look among the new antiseptics for this. Is it to be found there and at a reasonable price? Frankly, I do not know.

Many of the drugs and their combinations standardized in the last edition of the U. S. Pharmacopeia were first put on the market in the "proprietary" form. Let us hope that the same course may follow for a better antiseptic.

European Letter

By LLOYD CHAMPLAIN, A. B., D. V. S., Liverpool, England

EDITORIAL NOTE.—Dr. Champlain, editor of "The Milk-Man," Kansas City, is touring Europe, principally on foot, for the purpose of studying milk-conditions there. He has consented to write a number of articles for VETERINARY MEDICINE. *He will write only of what he sees. His letters will not be compilations in any sense.*

An abattoir, or slaughter-house, as called in "the states" (I'm an Englishman at the present writing) is commonly known in England as a "lairage." The reason, as offered by one connected with one of these lairages, is that the cattle are tied, or, as he suggested, "laired." Now, this way they have of keeping every bovine tied by the head until dead would seem very awkward to an attaché of one of the big American plants. It would probably occur to him, as it does now to me, that the name comes from the principal occupation of the people thereabout, viz., keeping the cattle tied. The name has evidently come to include the slaughtering division through persons who thought of the place where the cattle were kept tied as the principal part of the whole establishment. The term in its strict use corresponds to the American term "stock-yards" or to be more exact, "cattle-pens."

The lairages at Birkenhead, a town across the Mersey from Liverpool, as Jersey City is across the Hudson from New York, are connected by short bridges with the landing stage where the live cattle from foreign countries, intended for slaughter in England, are taken from the ships. I say "live" cattle, because the cattle that are shipped alive into England these days constitute so small a part of England's beef that they deserve special emphasis. The great bulk of the beef comes dressed from the American continents.

Cattle that are unloaded at these lairages must not go out alive—they must be slaughtered. These are, so to speak, England's Southern cattle-pens. These shipments do not come as consignments to a commission

company to be sold to the packers, but as the property of the packers consigned to themselves in England. The principal packers here are "Swift" and "Morris." It is interesting to note, from the methods in vogue at these plants, how faithfully these great institutions have followed the old saying: "When in Rome, do as the Romans do."

The cattle are taken off the ship and tied by their heads with ropes, at their proper places in the lairage, just as so many milch-cows in a vaccary. Here they may be examined and bought by the man who contemplates them for the block in his meat-shop. "Kill me this one," or "these two," says the shopkeeper, and then he adds how he wants them dressed.

The beef is led by one person and driven by another into a slaughtering compartment. The long rope attached to the head of the bovine is passed around a low horizontal bar in such a way that as the leader pulls and the driver pushes the slack is "hitched up" and every inch gained held until finally the head is brought securely down to the bar. The instrument for felling is a poll-ax, a pointed part of which is driven with expert aim through the atlo-axoid space into the spinal cord. Immediately that the beast is down, another blow effects a hole in the roof of the cranium, through which is passed a rod about three-eighths of an inch in diameter by three feet in length down the tract of the spinal cord. (Herein lies a question for the physiologist—what is the benefit of this destruction of the cord?) The carcass is then bled and dressed according to the directions of the purchaser. Animals that are not bought on foot are slaughtered by the packers and sold dressed.

The work here is not accomplished by the specialization of labor that is seen in a big American plant. There is not a man for each minute part of the dressing—not an army with knives, steels, axes and saws going all day from carcass to carcass, each person doing an almost unnoticeable part of the work. A lairage steer getting slaughtered and dressed passes through the hands of only a few. The operators lack the speed and skill that attract attention in America; their tools are antiquated and unspecialized. Indeed, it looks very much as if the American packer conducting his small slaughtering-business in England does not want the Englishman to see how slaughtering can be done in a systematized and specialized way with time-saving and profit-making apparatus.

In the lairage-plan there is a minimum of waste and a maximum of saving. Blood is not running like rivers from the floor; thousands of gallons of water are not required daily to wash refuse away to the river. These are parlor slaughter-houses; everything is taken in charge as it comes in sight and disposed of before there is any accumulation.

The lairages and all buildings connected therewith are under the control of the Board of Public Docks, and are only tenanted by the packers. This, then, is also a condition that stands in the way of certain arrangements of buildings, chutes and apparatus, and the installation of improved machinery that might seem good to the packer. It must be said, though, to the credit of the Board, that the lairages are models of cleanliness and

cattle-comfort. High ceilings, good light and ventilation, dry and well-built concrete floors, and plenty of feed and bedding make these places worth notice.

Inspection is not conducted on the beds, as in "the states." An inspector who is not a veterinarian, but connected in some way with the food-inspection department of Birkenhead, has the prerogative to inspect and condemn.

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[In this connection the following paragraph from a London paper is of interest:—ED.]

City and County of London.—The Corporation has decided to revise the by-laws regulating the conduct of the business of cattle-slaughtering in the city, which have been in operation without alteration since 1877. The new by-laws make provision for the humane slaughtering of animals as advocated in the report of the Commission appointed by the government in 1904 to consider the subject. Each animal must be effectually stunned before being slaughtered, and be securely fastened, and no animal must be slaughtered and no blood allowed to flow in view of another animal. Having regard to the fact that the absence of any restrictions as to the times of slaughtering affords facilities for the improper disposal of any carcasses which may be unsound, and that inspection can be most satisfactorily carried out at the time of slaughter when all the organs are available, the Corporation has inserted, with the approval of the Local Government Board, a by-law to limit the hours accordingly.—*The Times.*

Fungous Poisoning in Animals*

By L. A. PAMMEL, Ph. D., Professor of Botany, Iowa State College, Ames, Iowa

Owing to the recent scare in connection with the disease pellagra, considerable interest has been manifested concerning the molds that are found upon corn, fodder and forage plants. The question of molds responsible for disease is one that has long been settled in the affirmative by veterinarians. There can be no question that various kinds of molds are responsible for the disease known as forage-poisoning. It will not be necessary for me to express an opinion at this time as to whether maidismus or pellagra and forage-poisoning or the socalled cerebritis of Dr. Mayo, are one and the same disease. There are some similar symptoms. Nor do I wish to say at this time that certain forms of bacteria may not produce toxic substances which may not in part be responsible for these troubles. Some of the saprophytic fungi also produce toxic substances and may therefore produce some of these symptoms.

MOLDY CORN IN IOWA

During the past autumn we have received frequent requests for the identification of molds on corn. The following is a sample illustration

*Read at meeting of the Iowa State Veterinary Association, Des Moines, Feb. 16, 17, 18, 1910.

of requests for information that have come to me in regard to this trouble, and I take the liberty of reproducing my reply to the same as it appeared in the *Breeder's Gazette:*

W. F. R., of Plymouth, Iowa, states that much of the corn in this vicinity is moldy and that hogs do not eat the moldy corn, nor do chickens but that cattle seem to like it.

"There is a great deal of complaint in many parts of the state and in the corn-belt of moldy corn. The molds, however, occurring on corn are by no means referable to the same kind. We have seen a greenish mold, a pink mold, and a white mold. These various molds cause a great deal of injury to the corn-crop.

"Drs. Burrill and Barett estimate that in 1906, 10 percent of the ears were attacked, and they reported that by actual count as much as 20 percent; they also estimate that in 1906 the loss was not far from 4.5 percent; in 1907, 2 percent, for Illinois. The loss for Illinois in 1906 was more than $5,000,000 and the loss in 1907 about $2,000,000. The loss in Iowa this year will probably be more than $5,000,000. I should be glad to hear from Iowa readers as to the injury it is doing to the present crop. It is probable that the loss for the United States will reach $20,000,000. This is not only by the direct loss of the crop but also because of the injuries that may result from feeding such corn to live stock or utilizing it as food for man; serious results have been known to follow.

The molds which have been described are referable to a number of distinct species, but the one which apparently does the greatest amount of injury is known to botanists as *Diplodia zeae.* This fungus, during its active growing stage, produces fungus threads that are white in color; later there is developed from this whitish mass little black bodies which contain spores that serve to reproduce the fungus. This fungus not only occurs on the corn, but the leaves and sheath of the cornstalk as well.

Several other molds have been found on the corn and some of them have been referred to *Fusarium.* These fungi differ from the preceding in the character of the spores that are produced and in their superficial appearance. A dense, felty mass of threads is produced which occurs between the kernels, even extending to the cob; some of them produce a pink or red color, but apparently this does not always occur in some of the forms. Burrill and Barett have detected three forms of this type of mold. It is perhaps immaterial to say anything about the name that should be given it. The important point to remember is this: It is a destructive parasitic disease and along with other molds may give rise to a disease in animals that has been known under the general name of "forage-poisoning," or to which Dr. Mayo has given the name of cerebritis."

PELLAGRA AND DIPLODIA

Dr. Erwin F. Smith some months ago in "Science" called attention to the probability that these molds might be the cause of pellagra in man. This suggestion seems to have occurred also to other investigators. Dr.

Powers at the first pellagra-conference in Columbia, S. C., called attention to the similarity of the symptoms of forage-poisoning and pellagra in man. The same thing has suggested itself to a number of others. Therefore it is important that where this moldy corn occurs care should be used in feeding it to cattle or other live stock.

"Two recent articles have been published on the subject of "Ear Rot of Corn," by Burrill and Barett of the Illinois Experiment Station, Urbana, Ill., and Wilcox and Heald of the Nebraska Experiment Station, Lincoln, Nebraska."

FUNGI AND DISEASE IN ANIMALS

The lower plants, Thallophytes, are divided into (1) slime molds, (2) bacteria, (3) algæ, (4) fungi, (5) lichens. An alga is a thallophyte with chlorophyll. A fungus is a thallophyte without chlorophyll.

The fungi concerned in the disease of animals are of two types. One in which the fungus or organism is pathogenic and the second caused by fungi that are saprophytic or parasitic upon the host plant; these produce such diseases as mycotic-stomatitis or forage-poisoning. These in some cases secrete an enzyme or a toxin, or they may cause mechanical irritation.

Some of the parasitic fungi produce what is known as dermatomycosis. This term is derived from two Greek words meaning skin and fungus. The classification of the fungi concerned is not at all satisfactory; at present, however, they are generally included in the groups known as *Fungi imperfecti*, the *Mucoraceæ* and *Ascomycetes*.

The *Fungi imperfecti* include a large group of fungi whose life-history has not been worked out completely. The fungi of this class are form-genera, such as the favus fungus. The socalled *Achorion* (*Oospora*) and *Trichophyton* of various authors represent such form-genera, the *Oidium albicans* being another type; of these, some, perhaps, never produce any other kind of spore than the one commonly seen.

Many of these genera undoubtedly belong to the *Ascomycetes*, in which the spores are produced in little sacs called asci, the spores being known as ascospores. A kind of ringworm of the dog (*Eidamella spinosa*) belongs to this group, also the forms that produce aspergillosis, one type of which occurs in the ear.

PATHOGENIC FUNGI

The *Mucoraceæ* produce an unsegmented mycelium and septa only where the reproductive bodies are formed; the spores usually occur in sporangia, or occasionally small spores may occur in the mycelium; zygospores which result from fertilization also occur in some species. Several species produce surface-lesions.

According to Neumann, the dermatophytes of domestic animals belong to six distinct genera of fungi, as follows: *Trichophyton, Eidamella, Microsporon, Achorion, Lophophyton, and Oospora*. These genera are not, however, all accepted by botanists.

Trichophyton was established by Malmsten in 1848 and is characterized by having a mycelium consisting of simple or dichotomously branched filaments and producing spores from 4 to 9 microns long. Sabouraud, however, divides the genus into several species, depending on the position of the fungus with regard to the invaded hair. The *T. endothrix* lives inside the hair; the *T. ectothrix* develops outside of the hair, forming a sheath around it, and the *T. endo-ectothrix* develops both inside and outside the hair. This classification is scarecly tenable from either clinical or cultural characters. We have placed this genus with *Sporotrichum*.

The *Eidamella spinosa* described by Matruchot and Dassonville in 1901, has a much-branched mycelium, 1-5 microns in diameter, divided into short segments and splitting into somewhat squarish oval bodies; it is found on the dog. The *Monascus* found by Buchan in moldy silage is closely related to this fungus.

The *Microsporon*, discovered by Gruby in 1843, has a branched mycelium, the latter branches bearing conidia from 2 to 3 microns in diameter. This fungus has also been placed with *sporotrichum*.

The *Lophophyton*, described by Matruchot and Dassonville in 1899, produces a mycelium with some tortuous filaments, others short curved, with thick curved walls; no spores produced; it occurs on fowls. I have referred this to *Sporotrichum*.

The *Achorion* was described by Remak in 1833. The filaments of the mycelium are from 2 to 3 microns in diameter, flexuose or straight, variously branched; finally breaking up into spores. This fungus has been placed with the genus *Oospora*.

Another class of parasitic fungi have been referred to the yeasts and commonly produce what is known as blastomycetic dermatitis. These fungi have generally been referred to yeast plants, although it appears to me that they are *Hyphomycetes* rather than *Saccharmycetes*. There can be no question that these fungi are responsible for certain serious troubles both in man and lower animals.

Pneumonomycosis is a not uncommon disease of domestic animals caused chiefly by the mold *Aspergillus fumigatus*, although the *Aspergillus niger* is also pathogenic for birds. This disease is most frequent in birds, both domestic and wild, occasionally observed in horses and cattle, and rarely in man. Respiratory diseases and lowered vitality are predisposing factors in its development. In all species the disease is characterized by purulent local inflammations in the lungs or other tissues, and a purulent and necrotic pseudo-membrane upon the bronchial, tracheal, and other mucous membranes upon which it grows. The appearance of the pulmonary lesions sometimes resembles tubercle, sometimes actinomycosis.

Certain species of *Penicillium* are parasitic. The *Fusarium equinum* produces a mange in horses. No doubt many other parasitic fungi will be added to the list given above.

SAPROPHYTIC FUNGI

We are especially interested at this time in the saprophytic species that are capable of producing toxic poisons. One of the oldest and best known of these is the common ergot (*Claviceps purpurea*). Ergot is known to contain a toxic substance of considerable potency. The fungus, too, is widely distributed on a large number of our common forage plants, particularly frequent upon red top and timothy and here it is often overlooked.

We have several excellent illustrations of how other external known parasitic organisms may produce disease. Catarrhal stomatitis, for instance, may be produced by ingestion of fodder which has become infected with any one of several fungi and bacteria belonging to distinct families. Among these are the rust of clover, bacteria, mildew of grass, and the rape-destroying fungus, *Polydesmus exitiosus;* even the common grass rust and other rusts upon grasses as well as the Bunts and smuts are known to produce this form of disease.

Serious diseases of the stomach are caused not only by pathogenic germs but also by the ingestion of various foods. Many foods, such as unclean, or damaged fodder, poor water, musty hay, moldy corn, decomposing potatoes, are responsible for gastrointestinal catarrh; many fodders also contain irritant substances. There are several forms of gastric enteritis. Among forms of the third class (including those caused by ingestion of lower organisms, such as fungi or poisonous substances) we may mention botulismus, fish-poisoning, injuries produced by mold fungi, smuts, rusts, and, finally, the socalled gastroenteritis produced by numerous poisons. These have sometimes been classed as irritant poisons and narcotic irritant poisons.

A somewhat detailed study of the fungi which occur in connection with moldy corn has been made. We have often found in this state the common pink mold (*Fusarium roseum*) which is characterized by the development of a felty mass of white mycelium which extends over the kernels and between them down to the cob, often with a pinkish color; the spores or conidia are colorless, slightly curved and constricted at the points of division. The socalled microconidia are colorless, obovate to pyroform being produced on the branched conidiophores.

Prof. Burrill and Mr. Barrett, who have made a careful study of the molds of corn in Illinois, are inclined to think that there are at least three species of *Fusarium* affecting the corn.

Another fungus commonly occurring upon corn is the *Diplodia*, a fungus described also by these writers and Profs. Wilcox and Heald, of the University of Nebraska. The mycelium of this fungus is white in color and consists of branched threads, the threads penetrating the tissues of the grains and of the cob. When the fungus is maturing small black bodies develop in the husks and cob, or, rarely, in the grain, these contain purplish-brown and slender, two-celled spores. This fungus evidently is very widely distributed in the corn-growing sections of this country and

Dr. Erwin F. Smith has suggested that there may be some relationship between this fungus and the socalled pellagra.

In addition to the above fungi, a host of other saprophytic fungi may be found, *Cladosporum herbarum, Alternaria, Aspergillus,* all of which undoubtedly may be concerned with forage-poisoning. During the winter of 1908–1909, several cases of poisoning from spoiled silage were reported to Dr. Stange of the Iowa State College. Other cases have no doubt been encountered. In every instance, as in the case reported by Dr. Beaumont, molds occurred in the silage. Dr. Beaumont says: "I am sending you under separate cover by mail a specimen of corn silage upon which you will notice is growing some form of mold which in my opinion is accountable for a very peculiar disease, existing among a herd of young horses and mules belonging to a farmer living here." Dr. Beaumont also reported several cases of poisoning from silage. It is probable that the molds have some connection with this disease. I have discussed all of these fungi more or less at length in my "Manual of Poisonous Plants."

Equine Infectious Anemia*

By A. T. KINSLEY, M. SC., D. V. S.

Equine infectious anemia, also known as pernicious anemia, swamp fever, equine malaria, or Spanish fever, prevails in various states of the United States, in some of the provinces of Canada and in some European countries.

Some literature is now available on the subject of equine infectious anemia. The first accurate description of the disease appeared in 1904. Several subsequent reports from various locations contain additional information concerning it.

In 1902 this disease prevailed in Northeastern Indian Territory (Oklahoma) and at that time several blood smears were examined, but nothing definite was determined.

Equine infectious anemia is characterized by extensive blood-changes, by variations of the severity of the attack, by irregularity of course, and is accompanied by symptoms of general anemia.

The causative factor has not been identified, but is known to be a filterable virus which is probably primarily located in the blood of the affected animals. The infection appears to remain on farms for a considerable length of time and is probably capable of existing for some time outside of the animal body. Thus one farm near Coffeyville, Kan., has been affected for about fifteen years, the owner having lost horses or mules nearly every year during that time. Another farmer in Montgomery County, Kan., lost all of his horses with equine infectious anemia during the winter of 1907-8, and during the summer of 1908 a pony was kept in the barn for about four weeks, and it became affected and died.

*Presented at the fourteenth annual meeting of the United States Live Stock Sanitary Association, Chicago, Dec. 5-7, 1910.

The infection is not readily transferred from farm to farm, for several premises that were free from the disease were inspected in Oklahoma and Kansas that were within sixty to one-hundred rods of barns in which the disease had prevailed periodically or continually for several years, however, the disease is slowly becoming more general, i. e., a greater territory is infected. During the past eight years the disease has extended nearly 200 miles north and east into Kansas and Missouri, from the location in which it was first identified in Oklahoma.

Many theories have been advanced as to the source of the virus and the manner of infection, but nothing has been positively determined to date. The disease is transmissible from affected animals to healthy susceptible animals by blood inoculation, however, it appears that blood-sucking parasites have no relation to the transmission of the disease as single cases have been observed in barms where flies and mosquitoes swarmed indiscriminately from the diseased to the healthy horses. The disease has been observed affecting one of a team of horses that were watered from the same trough or pail and fed in a common manger and feed-box. Colts may become affected while suckling a healthy, unaffected mare, in other instances colts may suckle affected mares with impunity.

Horses and mules are about equally susceptible, the disease probably being slightly more prevalent in horses. The disease has no regard for age, or breed, neither does the kind of food vary the susceptibility. Dr. B. A. Robinson of Independence, Kan., is of the opinion that the infection is obtained in water, but this cannot be verified in other locations. The disease is equally prevalent in river bottoms, and on the hills, but it is more prevalent in July, August and September than during the remainder of the year. There is no doubt but what the disease is more prevalent in wet seasons, in fact, in Southern Kansas this disease has not been very prevalent during the last two seasons, and both seasons have been exceptionally dry, particularly during the summer months.

The disease may appear suddenly or it may have an insidious onset. In those cases in which the disease appears suddenly the affected animal has a very dejected appearance. The temperature varies from 104° to 107° F., and if the animals are not treated the high temperature continues for from three to eight days with slight variations. Respiration is usually accelerated, the increased rate being in proportion to the temperature. The cardio-vascular variations are the most constant and characteristic symptoms: the first impression of the pulse, in practically every case, is that it is wiry, though on close examination it is found to be full, but it is compressible and feels streamy, i. e., the principal pulse wave is followed by a secondary streaming flow of smaller volume—an anemic pulse. The pulse rate varies from sixty to ninety per minute, depending upon the severity of the attack. There is an indistinct cardiac murmur typical of anemia, and a jugular pulse which becomes more and more marked as the disease advances. The animals are quite weak, in some instances they stagger when walking. The visible mucous membranes, which are

at first blanched, later assume a dirty-yellow color. Petechial hemorrhages, varying in size from a mere point to irregular areas of the diameter of a lead-pencil are present in the ocular mucous membrane. All sphincter muscles are relaxed. The anus is frequently so flaccid that it is necessary to insert a thermometer far into the rectum to obtain the body temperature. There may be frequent urination, and in the later stages of the disease there may be constant dribbling of urine, because of the relaxation of the cystic sphincter. The animals become extremely emaciated and there may be edema of the dependent parts. In the later stages the animals always become very weak, although they may eat ravenously until they die. In some instances the animal appears to suffer considerably in the beginning. The affected animals appear restless, frequently rolling and groaning, and while standing constantly shifting from one foot to the other. This shifting is especially marked in the posterior limbs. An occasional case is observed in which there is epistaxis.

The premonitory symptoms of those cases having an insidious onset, consist of a general dejected appearance and the affected animals fatigue easily. After the onset the symptoms are the same as described above except they are less intense.

The chronic type is usually secondary to an acute attack, the chronic form being continuous or periodic and this type is probably more frequent in those cases in which the disease had an insidious onset. When the attack is continuous the general indications of the disease are emaciation, weakness, edema of dependent parts, and a worn-out appearance. The animals affected with the chronic type always eat heartily. The mucous membranes are dirty white or pale yellow in color, and there may be a rise of from one to three degrees in temperature. The respiration is accelerated, the pulse is of the characteristic anemic type. There is always a marked jugular pulse and a typical heart murmur. The submaxillary lymph-nodes are usually enlarged. The symptoms are practically the same during the attacks of the periodic type as described in the acute cases. During the intermission in the periodic type the animals are dull and fatigue easily, although their appetite is good and they apparently digest all of the food they consume. There is usually more or less weakness in the posterior limbs, which in some instances becomes so marked that the animals fall when turned quickly.

There are usually some cutaneous wounds found on postmortem examination, caused by the animals falling against fences or mangers or even to the ground. The blood is thin, pale and water-like and separates as it coagulates. The various lymph nodes are enlarged, edematous, hyperemic, hemorrhagic or necrotic, the mesenteric group being the most extensively involved. There is a subcutaneous edema of the dependent parts in the chronic cases, but edema is usually absent in the acute type of the disease. The peritoneal, pleural and pericardial cavities usually contain a considerable quantity of a thin, limpid fluid. The serous membranes are pale, flakes of coagulated lymph are deposited upon them, and

petechial hemorrhages are usually noted in the sub-serous structures, particularly of the small intestine. The visceral organs are anemic; the digestive tract always contains a considerable amount of food-stuff, especially in the chronic cases. The liver, though usually normal in size, is icteric, the intensity depending upon the chronicity of the case. The spleen is about normal in size in the acute cases, though it is darker in color and softer in consistency; in chronic cases it is enlarged and more or less indurated. The kidneys are anemic and friable, and it is not uncommon to find infarcts in their cortex. The bladder is usually empty because of the relaxed sphincter vesicæ. The lungs are usually edematous and contain many petechial hemorrhages in the subpleura. The heart is pale, friable and contains subpericardial and endocardial hemorrhages; it is always enlarged in chronic cases and may contain infarcts. The cerebral and spinal meninges are usually anemic, though their veins may be gorged with blood. The brain and spinal cord are anemic, soft, and usually contain petechial hemorrhages beneath the pia-mater. The red bone marrow is dark in color, the yellow marrow is gelatinous in consistency.

The most characteristic microscopic lesions are found in the blood. The hemoglobin content (which according to the Tallquist scale ranges from ninety to one hundred percent in normal equines) varies from ten percent to eighty-five percent in the affected animals. The red-blood corpuscles vary from 1,006,400 per cubic millimeter to 6,800,000 per cubic millimeter. There is anisocytosis, poikilocytosis, and occasionally a nucleated cell (erythroblast) is observed. The changes occurring in the white blood-corpuscles are somewhat variable. The one principal change is the increased proportion of poly-morphs. The muscular and glandular tissues are affected with parenchymatous degeneration. Pigmentation with hemoglobin and its derivation is prevalent in practically all tissues, especially the liver, spleen and heart, and if the case is of long standing the tissue in which petechial hemorrhage occurs is also intensely pigmented. The liver cells are extensively disintegrated. The central portion of the liver lobules are infiltrated with leukocytes, and the liver cells and intercellular spaces contain pigmentary deposits in those cases that have died of the acute type of the disease. In the chronic type the principal hepatic lesion consists of fibrous hyperplasia and pigmentation. The spleen contains an excess of blood in the early stages, and the splenic corpuscles are practically obliterated, cell fragments and detritus are found mingled with the splenic pulp in the later stages of the acute type, but when the disease has become chronic there is a limited sclerosis throughout the entire splenic tissue.

The principal diagnostic symptoms of acute infectious anemia are high temperature, accelerated respiration, anemic pulse, anemic cardiac murmur, jugular pulse, petechial or muddy appearance of the conjunctiva, relaxation of the sphincter muscles, enlargement of the sub-maxillary lymph nodes, and general depression. The location and history must also be given due credit. The hemoglobin test is of considerable value;

a complete blood examination gives positive evidence of anemia. The blood inoculation is the only positive method of diagnosis of this disease, although due consideration of the history and symptoms usually gives sufficient evidence for diagnosis.

The principal diagnostic symptoms of the chronic type are emaciation; circulatory disturbances of the same character but more intense than in the acute type, muddy appearance of all visible mucous membranes, relaxed sphincter muscles; general weakness, especially marked in posterior limbs. The hemoglobin will be found to vary from ten to seventy percent. The red blood-corpuscles may be diminished to 1,000,000 per cubic centimeter. There will be poikilocytosis and anisocytosis and there may be an occasional nucleated red blood-cell. The percentage of polymorph leukocytes is increased.

The prognosis should be guarded. Most practitioners report a mortality of about fifty percent.

Extract from Proceedings of the Fourteenth Annual Meeting of the United States Live Stock Sanitary Association

Held at the Grand Pacific Hotel, Chicago, Ill., December 5, 6 and 7, 1910. President, C. E. Cotton.

The address of welcome was made by J. H. Moore, President, Chicago Live Stock Exchange.

Dr. Mohler stated in response that this country had five billion dollars invested in the various kinds of domesticated animals, which on every side were threatened with pestilence and disease, and stated that two hundred millions of these were lost annually from animal disease.

Address by President, Dr. C. E. Cotton:

By the change in our constitution at the last annual meeting, any person engaged in live stock sanitary work for federal, state, territorial, county or municipal governments, and any other person interested in live stock sanitation is eligible and may be elected to active membership. This should make this association the leading and largest organization of its kind in the world, and we must not forget our responsibilities. We should be the advisory body for all federal, state, county and municipal legislation for the control of contagious diseases of live stock and we should use our influence to have such legislation in harmony and not conflicting.

Our association is composed of laymen and stockmen interested in the welfare of our live stock industry, as well as scientific men engaged in investigation and control of contagious diseases. These laymen are of the greatest value in the accomplishment of our work to educate the public. At our meetings we learn of the study of the various diseases and the practical methods of controlling and eradicating them, and we return to

our homes prepared and encouraged to educate the public in our localities and to work for the proper legislation to control and stamp out contagious diseases.

He also spoke about the cattle tick and its eradication, the work that is being undertaken with hog cholera in the various states and the eradication of the sheep scab in the western states which is progressing rapidly. Also the control of lip and leg disease in the sheep in the west. One of the greatest problems is controlling glanders, rabies and tuberculosis.

The Secretary announced that thirty-four states had representatives present.

The next paper was that of Dr. A. D. Melvin, Chief of the Bureau, who read a paper entitled, "Federal and State Cooperation in Live Stock Sanitary Control." The Doctor suggested a more systematic cooperation with the Federal government and the different state authorities. He deplored the fact that the United States did not have the same as European countries, a system for reporting the presence and the extent of contagious diseases of live stock. He thought by thorough cooperation with the various live stock boards that something tangible could be worked out, which would be of great importance to the United States. He stated that it was desirous to secure fuller information on the following diseases: Hog cholera, anthrax, glanders, tuberculosis, contagious abortion, scabies, necrobacillosis, contagious lymphangitis and rabies. In his paper he gave an outline of a plan that he had in mind, and which should be carefully considered by all sanitary boards.

The next was a paper by Dr. R. P. Steddom on "Tick Eradication in the South." The doctor went into the history of this work and gave in detail the progress made in the eradication of this disease in the south, and also suggested some new regulations. His paper gave a very hopeful outlook for the eradication of the fever tick and with it of course splenic fever.

Dr. Steddom's and Dr. Melvin's papers were then discussed by various members, especially the members of the south, who gave their version as to the greatest obstacles in the way of more successful work. The principal ones discussing this were, Dr. Keane, Dr. Powers, Mr. Bryan, Dr. Lewis, Peter Bahnsen, Dr. Nighbert and E. B. Spiller, Dr. Forbes, Dr. M. P. Anderson, Dr. T. M. Owen, Dr. J. A. Kiernan, Dr. L. J. Allen, Dr. Ellenberger, Mr. P. S. Haner, Dr. Reynolds, Dr. Ward, Dr. Crewe and Dr. Leech.

The next paper was that of Dr. Luckey, and was of much importance to the cattle owners, for it described a new parasite, Œsophagostoma Inflatum. This parasite was found during the wet season on low, wet ground and caused a considerable loss in a number of herds and the Doctor described the parasite, also the symptoms, in a very clear manner. He also gave his line of treatment and the prevention of this disease. This was discussed by Dr. Ranson, of the Bureau of Animal Industry, Dr. Moore of New York and others.

Next was a report by Dr. Niles on hog cholera investigation. The Doctor gave a report of the work of the Bureau of Animal Industry and stated what methods they were pursuing and the experiments they were conducting to perfect the methods now in vogue. He gave a very great deal of experimental data which was of great importance to the members present.

This was followed by a very interesting paper by Dr. Eichhorn who had been abroad and while there visited the laboratories of Austria-Hungary. He described in detail the workings of this large laboratory, stating the number of animals that they had under treatment and the number of acres that it required. This laboratory has produced during 1910 monthly about 260 liters of serum. The institution aims to have always on hand a supply of serum to comply with all requests. He stated that they had treated approximately 400,000 animals and described in detail the method of their manufacture, how the material was sent out to the farmer and what they charged for it.

The next paper was that of Dr. Schoenleber, entitled, "Some necessary precautions in anti-hog cholera field work." He gave a resumé of the work done in Kansas and stated that they had treated approximately 20,000 head of hogs.

This was followed by Dr. Fisher of Ohio, who reported on the serum work in his state, giving in detail the work done there; that they had sent out about 60,000 20-Cc. doses, used 312 hyperimmunization hogs. He also described their method of sending out their serum and the rules and regulations governing the same.

This was followed by Dr. Reynolds of Minnesota, who gave a report of hog cholera work in the state of Minnesota, describing their method and the rules and regulations under which they worked in sending out this serum.

Following Dr. Reynolds, Dr. Peters reported for the state of Illinois, stating that 22,000 head of hogs were treated during the year. The tabulated reports of 15,000: 31 percent of the 15,000 were sick, and 79 percent of the 15,000 were saved.

This was followed by Dr. Marshall of Wisconsin, who also reported for the State of Michigan. Followed by Dr. Craig of Indiana and Dr. Moore of New York. In conclusion.

Dr. Dorset, the gentleman who originated the method, then discussed the subject briefly. He deplored the fact that the serum was employed largely in diseased hogs, stating that this would be expensive and continue to be so as long as this method was practised and stated that there should be some well-defined method made in cooperating to secure the final reduction of this disease. He suggested that the various states adopt the plan recommended by Dr. Melvin in his paper before this meeting. He believed that some method could be worked out so that in a short time this disease could be eradicated.

Dr. Hughes read a very interesting paper, entitled, "The veterinarian as a factor in sanitary control work." The Doctor gave a history of sani-

tary control work from the dawn of civilization and very ably brought forth the influence of sanitary control work and how sanitary work had come about, and the results accomplished since the inauguration of sanitary work by the various governments throughout the world. He enumerated the number of diseases that have been practically stamped out or held in check thereby. He also showed up the defective side of the work and made suggestions where this could be materially strengthened. This paper brought out a liberal discussion which was participated in by many.

The next paper was that of O. E. Dyson on a reasonable plan for the control of bovine tuberculosis. This paper treated on the fundamental principles involved in the eradication or control of bovine tuberculosis. Under specific recommendations, he said in order to encourage a larger production of healthy cattle throughout the United States, laws should be enacted in every state requiring that anyone having knowledge of the existence of this disease in cattle or hogs should notify the state representatives. He also suggested that provisions be made under quarantine regulations to permit breeders to sell or purchase cattle which have reacted to the tuberculin test and are properly branded. No compensation should be paid to the owners of animals slaughtered until said owner had conformed to every regulation supplied by state or federal authority. The sale, distribution or use of tuberculin for testing cattle should be prohibited, except under state and federal laws, providing for its official use. The doctor classed herds with respect to their freedom from tubercular taint as A, B and C, and advocated different transportation and sale regulations for each class.

Ex-Governor Hoard's paper on "Tuberculosis Control From a Layman's Standpoint" gave his first experience with the use of tuberculin and what it had done for him. At the first test he discovered four animals to be affected. These were destroyed, and the autopsy proved the correctness of the test. A year later the test eliminated two diseased animals, since which time the herd has been tested annually, but no reactors found. He has tested regularly and maintained a clean herd for a dozen years. He does not take any animals into his herd that have not been thoroughly tested and quarantined for months. He says: "To this latter, I owe a large part of my exemption from this disease. He says every man should have pride and patriotism enough to wish to maintain a healthy herd. "In my opinion, every farmer should test his cattle once a year at least and take no animals into his herd until he is absolutely certain that they are free from all contagious diseases," said Governor Hoard.

A paper was given by Dr. Ravenel, on "Control of Bovine Tuberculosis by Means of Vaccination." Dr. Ravenel gave a very interesting paper. He gave the history of bovine vaccination and the commission who were responsible for the work as early as 1892, and brought the work of vaccination against this disease to date. He quoted all the investigators that had taken part in vaccination against tuberculosis and also gave a detailed report of their methods pursued and the results obtained. He was hopeful

that a vaccine would be found that could be used to immunize cattle against tuberculosis and quoted investigators that are at work.

Dr. Ravenel's address was followed by a paper by Dr. Ward of Minnesota, entitled, "Extension of State Control of Tuberculosis." The Doctor recommended that as pure bred cattle are frequently tuberculous—he said, in fact, very few of the fashionable breeds were free from the disease—some measure should be put in force to eradicate this disease among them; before enforcing the testing of pure bred herds, a legislative act is necessary. He stated that opposition on the part of the breeders to such a measure could not be very pronounced. He stated that having cleaned the pure bred herds, the next great source of danger was the creameries. He recommended the pasteurization of all creamery by-products. He says the greatest problem of all city ordinances lies in protecting the dairymen from buying diseased animals. Many dairy cows are shipped interstate to stockyards situated at points like Chicago, Omaha, Sioux City and St. Paul, which are never inspected for the reason that they are shipped for supposed slaughter, but on arrival at the yards many of these are sold to dairymen without inspection. He recommends the compulsory notification of the existence of tuberculosis, and another feature in extending control work, which has frequently been overlooked, is the disinfection of premises in which diseased animals have been housed. He is heartily in favor of uniform certificates of health, which could be readily identified by all railroad agents. To prevent shippers and veterinarians from supplying themselves with blank certificates, he would suggest a form be adopted similar to the B. A. I. 24-B, having printed thereon, "Permission of the United States Department of Agriculture." Sanitary authorities could then issue blank forms to reputable veterinarians as required.

This was followed by a general discussion by Drs. Reynolds, DeVine, Luckey, Moore, Leach, Bahnsen, Craig, Melvin and Mr. Bryan.

Following this, Dr. Fraser presented a paper on, "Sanitary Milk from the Producer's Standpoint." He stated that milk was entirely an infant food and about sixty-five percent of all babies are brought up on cow's milk, and that therefore the public may rightly demand sanitary milk. He stated that in some places it was almost impossible to secure in the open market a good milk product. He suggested to bring about an improvement in these conditions, the producers and handlers of the product should be educated to the importance of the fact that if the milk is not kept clean bacteria will enter and thereby cause death to human beings. He deplored that the true food value of milk was not appreciated and that it was not more freely used than it is. He drew attention to the importance of cleanliness in the production of milk, and that if the product is not kept clean a large amount of sickness and suffering is caused therefrom. He stated that high prices do not necessarily mean clean milk. Unfortunately the general public is not earnestly interested in the milk-problem further than the price is concerned.

The next paper was that of Claude D. Morris, V. S., on "Sanitary Handling of Commercial Milk." He described the up-to-date method of handling milk on the farm, how it is taken from the cow and kept in a clean condition until it is delivered, either to the factory, or to the consumer. He described practical methods for the country bottling factory system in conformity with the state and city authorities in connection with the market production; also, to have his herd clean from diseased animals. He pleaded for the better conditions on the farm, in correcting the errors that are very often found there.

The next paper was by Dr. Black on sanitary milk, which would be practically free from diseases, such as typhoid germs, scarlet fever and diphtheria. He gave in detail the work of the commission and what they were doing for the milk consumers and the producers of the state of Illinois that were supplying milk to the city of Chicago.

Dr. Evans, City Health Commissioner of the city of Chicago, then spoke on the subject of clean milk. He pleaded for clean milk and gave in detail the work that his laboratories were doing in Chicago, for the milk men that are furnishing milk to the city of Chicago, and how they had reduced the death-rate among babies thereby, and also other sickness in proportion.

Dr. Mohler described the Russian diagnostic test for glanders. He had some specimens presented and demonstrated the method before the association, which was intensely interesting to all those present. He stated that this method was reported as very accurate and very much easier in its application and hoped that the experiments would continue as favorably as they have been for the last few months, and he thought that if they would continue to be so, it would be universally adopted.

The next was Mr. W. R. Manss. His subject was, "Reasonable Sanitary Measures in Live Stock Transportation." Mr. Manss related the method of handling live stock and the difficulties that arise in transporting the same. He cited the demands that are placed on the railroad companies by the shippers and urged for hearty cooperation between the state and federal authorities. He also made an eloquent plea for a uniform certificate of health that would be recognized by all authorities and that could be easily interpreted and would not require any legal talent, so that when a shipment started from one end of the United States with a certificate, that that certificate would be honored throughout.

Papers by Dr. Mack and Dr. Kinsley related to the same subject, "Equine Anemia." [Published in this issue.]

The next paper read was the report of the Committee on Basic Law. This committee favored uniform laws for the various states regulating sanitary boards and live-stock commissions.

One of the most important resolutions passed was that of the Committee on Uniform Health Certificates:

"This Committee recommends to the U. S. Live Stock Sanitary Association, that it request the B. A. I. to formulate a uniform certificate

for the interstate shipment of live stock destined to states requiring inspection, and in the case of cattle for milk production and breeding purposes, destined to states requiring the tuberculin test; such certificate to be accompanied by a record of said test, issued by a qualified veterinarian regularly registered with the Bureau of Animal Industry."

R. W. HICKMAN.
S. H. WARD.
J. F. DEVINE.
CHARLES KEANE.
PETER F. BAHNSEN.

The Committee on Tick Eradication then handed in its report, a very lengthy one, dealing with the quarantine regulations for the ensuing year in all the tick-infested states. This report was adopted as read.

The election of officers for the ensuing year, resulted as follows:

President, Dr. J. F. DeVine, of Albany, New York; First Vice-president, F. A. Walker, of Massachusetts; Second Vice-president, Dr. Charles Keane, of Sacramento, Cal.; Third Vice-president, G. T. Bryan, of Guthrie, Okla.; Fourth Vice-president, Dr. W. F. Crewe, of Devil's Lake, N. D.; Fifth Vice-president, Dr. M. H. Reynolds, of St. Paul, Minn.; Secretary, J. J. Ferguson, of Chicago, Ill.

After a vote of thanks to President Cotton for his efficient and capable manner by which he had conducted the meeting, the Convention adjourned *sine die*.

J. J. FERGUSON, *Secretary*.

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FOR SALE—A good veterinary practice in a thriving town. Large tributary country. Best of reasons for selling. Address Box 311, Traer, Iowa.

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FOR SALE—Residence and hospital, with paying Iowa practice. Address No. 60, care of VETERINARY MEDICINE, 1926 Wilson Ave., Chicago, Ill.

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Volume VI

Heretofore the year for VETERINARY MEDICINE has been completed with the March issue and the new year has commenced with April. A volume, as applied to publications, usually refers to all the issues of a year or of a half-year. The magazine-year in most instances corresponds to the calendar-year—that is, it has been found most convenient to begin it with the January and end it with the December issue. We are for this reason beginning Volume six with the issue that would, if numbered serially, be number ten of Volume five. This does not mean that we are skipping two numbers; subscribers will receive their allotted number of issues as if no change of numbering had occurred.

Grouping a certain number of issues of a magazine into a volume is of no consequence to the reader except he preserves his copies for reference and an index to the contents of the volume is furnished by the publisher. A great many readers of VETERINARY MEDICINE save their copies of every issue and find them of great value for reference as problems come up in their practice which have been discussed in its pages. For the convenience of such readers we will publish a very complete index for the whole year as a part of the last number of each volume. The index for Volume six will appear in the issue for next December and will include also the index for the nine numbers which were issued of Volume five.

THIS issue of VETERINARY MEDICINE may be said to be a sort of "long distance" issue. The editor has not been in the office of publication during the entire month. The many excellent veterinary meetings held during January and February offer so many good things to see and hear that he cannot be found in the "windy city" during that time.

Quinine and Urea Hydrochloride

This is a new product in veterinary medicine and its value as a local anesthetic has not been positively ascertained; there has been much praise and of it very little complaint. It possesses many advantages over cocaine as a local anesthetic among the more important of which are:

1. *It is non-toxic.*—Cocaine is unsuitable for anesthetizing large surfaces because of the cerebral excitement occasioned by large doses. In horses this delirium may not only interfere with the operation, but may cause the patient to seriously injure himself in his struggles. Quinine and urea hydrochloride has no general action and may safely be given in very large doses.

A veterinarian in a western city who recently used a quinine and urea hydrochloride solution for diagnostic purposes, not knowing the strength necessary to use, dissolved forty grains (ten times the necessary amount) and used it at one injection. Some swelling, which subsided in a few days, was the only unfavorable result. In about ten minutes, anesthesia was complete and the horse traveled sound and so continued to travel for eight days thereafter. During all this time the anesthesia of the part was profound.

2. *Solutions will keep for a long period.*—Solutions of cocaine are soon spoiled by the growth of fungi in them. Cocaine solutions cannot be boiled to sterilize them without decomposing the drug. They must therefore be freshly made for each injection. Sometimes a troublesome problem when no suitable solvent is at hand. Fungi do not grow in solutions of quinine and urea hydrochloride.

3. *It has a more prolonged effect.* Very strong solutions of quinine and urea hydrochloride will produce a complete anesthesia lasting several days; in some cases as long as ten days. This gives an opportunity for operative or other wounds to progress far toward healing, where this anesthetic is used before there is pain or irritation in the wound; hence there is no tendency on the part of the animal to molest it. In open-joint, nail-prick and some other extremely painful wounds the prolonged anesthetic effect that may be secured from this agent is an important consideration in the control of the animal and in the treatment.

Quinine and urea hydrochloride should be used in from two percent to five percent solutions. One grain dissolved in slightly less than one dram of sterile water gives a two-percent solution. Six grains dissolved in five drams of water make a two-percent solution of sufficient quantity for extensive operations. The action of quinine and

urea hydrochloride is as prompt as that of cocaine. Operations may begin within fifteen minutes after the injection of the anesthetic. The anesthesia persists so long that there is never a need for a second injection even for very prolonged operations.

At the clinic of the A. V. M. A. at San Francisco last September, Dr. L. A. Merillat of Chicago operated on a horse for the resection of tendon. The only anesthesia used was a local application of quinine and urea hydrochloride in solution of between two and three percent. The surgeon did not know what anesthetic was used, and during the operation inquired about the material used. Upon being told it was the new local anesthetic he replied, "Well, that is a fine anesthesia, anyway."

It is needless to say that in the use of quinine and urea hydrochloride as in other hypodermic medication strict antiseptic precautions should be adhered to. The hypodermic syringe must be sterile; there is less danger of infection from the water used in making the solution or from the skin. Alcohol, tincture of iodine or other reliable antiseptics should be used in preparing the site of injection. If it is practicable to obtain it, boiled water should be used for dissolving the tablet.

Bacterin Therapy

If one were to try to give definitely the present status of bacterin therapy it is probable that nearly every reader would to a greater or less extent dissent from his opinion, which is but saying in another way that vegetarians are nowhere near agreed on the usefulness of these products. The employment of bacterins in human medicine is not new. Koch's old tuberculin, with which he at first failed but with which others have succeeded in the treatment of tuberculosis, is a sort of bacterin. The Pasteur treatment for rabies is probably in many instances a bacterin treatment in the beginning. At least it has apparently been demonstrated that results, the same as those afforded by the Pasteur treatment, may be secured by bacterin treatment. Those who treat affections of mankind, at the present time, recognize among bacterins valuable products for the treatment of an exceedingly large number of ailments, including gonorrhea, tuberculosis, typhoid fever and the streptococcic infections, such as septicemia, lymphangitis, cellulitis, erysipelas and many others; also the staphylococcic infections, including acne, furunculosis, carbuncles, eczema, ulcers, sinuses, and many others, together with most of the varied forms of suppurative inflammation in eye, ear, nose and throat affections where both staphylococcic and streptococcic infections are present, and many times other organisms also.

In veterinary medicine, for reasons which are difficult to understand, bacterin therapy has received far less investigation and discussion than it has in human medicine. Notwithstanding this fact, for the treatment of a limited number of ailments—suppurative conditions—bacterins have been more generally used in veterinary practice than in the practice of

regular medicine. A little more than a decade ago the highest hopes were entertained for a mastery over communicable diseases by means of serum therapy. The first of the serums—diphtheria antitoxin—may be said to have fulfilled nearly every reasonable expectation. Tetanus antitoxin, although it has failed to measure up to the hopes entertained for it, has yet proved an invaluable addition to our therapeutics. Aside from these, serum therapy has been a signal disappointment, and this no doubt has much to do with the skepticism with which bacterin therapy has been received by the veterinary profession.

Nearly every veterinarian who has used bacterins has commenced their use with grave doubts as to their utility, and in many cases with preconceived unfavorable opinions. Yet no principles of therapeutics are today better understood than are the principles underlying bacterin therapy. The preparation of bacterins is understood, their action in the body is known, and their efficacy in properly selected cases has been demonstrated. It appears there is no valid reason why the progressive veterinarian should hesitate to employ bacterins, not as a panacea, or as a substitution for all other treatment wherever used, but as an addition to his therapeutics to be used in selected cases in conjunction with other indicated medication.

Bacterins are prepared from pure stock cultures of bacteria or from pure cultures derived directly from the infection of the disease to be treated. The former are stock bacterins, the latter autogenous bacterins. Autogenous bacterins have been prepared by simply heating a quantity of the discharge from an infected surface and also from smearing slant agar with the discharge and after twenty-four to thirty-six hours scraping off the growth, diluting and heating it. Strangely enough in isolated cases satisfactory results have been obtained from the use of autogenous bacterins prepared according to both of the above methods; nevertheless the use of bacterins so prepared must be unqualifiedly condemned. The first method is entirely unscientific and the size of the dose cannot be even approximately determined. Two doses prepared by this method from different cases might easily vary a thousand-fold in the number of killed bacteria contained. Bacterins prepared from cultures made by smearing portions of the discharge on culture media and using the growth are to be condemned on account of the danger attending their use and because of the doubtful proportions of organism such bacterins will contain where made from mixed infections. Suppurating tracts in the horse, as is to be expected from the surroundings, are frequently infected with, or contaminated by the tetanus bacillus in plentiful numbers. This bacillus does not grow in such wounds and is not harmful in these cases under ordinary circumstances; however, the tetanus bacillus will grow on agar cultures in the presence of staphylococcus or other ærobic organisms, and the toxin so produced must find its way into a bacterin made by this process. If this were not enough to condemn bacterins so made, the further fact that all open abscesses are commonly contaminated by molds and putrefactive or other organisms, and that these bacterins must contain

the contaminating organisms in addition to those of the primary infection and sometimes in greater abundance must furnish ample reason for their condemnation.

Autogenous bacterins prepared by plating out the organisms from the discharge and obtaining and growing them in pure culture, and where the product is tested for potence and toxicity and the doses properly standardized, are to be preferred to stock bacterins. But it requires expensive laboratory equipment and the skill of a bacteriologist to so prepare bacterins. Their high cost and the delay in beginning treatment must ever limit their use considerably in veterinary medicine. In human medicine in the treatment of certain subacute and chronic ailments where a high cost and some delay are not important considerations, autogenous bacterins suitable made are eminently desirable.

In veterinary practice bacterin therapy, intelligently applied as all therapeutic measures should be, has proven remarkably successful in the treatment of staphylococcus and streptococcus infections and to a somewhat less degree in bacillus coli infections. This includes a wide range of ailments of domestic animals, but there is every reason to believe that further investigation will result in a further application of bacterin therapy. Pneumonia is in large part due to streptococcus and staphylococcus organisms, and the pneumococcus itself is strikingly of the streptococcus type. It appears that a bacteriologist should be able to work out a bacterin for this infection.

The ordinary lesions by which we recognize hog cholera are due almost entirely to the bacillus cholera suis. Death of animals having hog cholera suspiciously resembles death from ordinary septicemia in acute cases and from toxemia in chronic cases. The bacillus cholera suis belongs to the same group to which the colon bacillus and the typhoid bacillus belong. From both of these latter organisms bacterins somewhat effective in the treatment of their infections have been made. Is it too much to hope for a bacterin for the treatment of hog cholera? We think it is not unreasonable to expect such a bacterin at least until further investigation has been conducted with this in view. With a bacterin successful in the treatment and in the prevention of hog cholera we would not be greatly concerned about the ultra-microscopic virus.

Experiment Station Publications

Testing Cream for Butter-Fat. Bulletin 145, Pardue University, Agricultural Experiment Station, Lafayette, Indiana. This is a popular bulletin containing detailed directions for sampling, preserving and testing cream. The various steps are illustrated by a number of drawings and photographs. It will be of considerable value to veterinarians engaged in milk-inspection.

Meningo-Encephalitis (Blind Staggers). Bulletin 173, Kansas State Agricultural College Experiment Station, Manhattan, Kansas.

This is essentially a report of progress in corn-mold investigations. The investigations are far from complete and no definite conclusions not already known can be said to have been reached.

Federal and State Dairy Laws and Standards for Evaporated Milk, Sweetened Condensed Milk and Condensed Skim-Milk. Bulletin 143, Pardue University Agricultural Experiment Station, Lafayette, Indiana. This publication is of interest to milk inspectors and others who have to do with dairy sanitation.

Abstracts from Recent Publications of Interest to Veterinarians

From "THE EXPERIMENT STATION RECORD"

Experiments with Barium Chlorid. W. E. Frink and H. B. Tillous (*N. Y. State Vet. Col.* (Pub.), No. 5, pp. 27-39).—"The drug in the doses recommended acts as a purgative, in degrees according to dosage, producing evacuations varying from mild catharsis to drastic purgation. This is produced by increased peristaltic movement and increased intestinal secretion. Furthermore, the drug acts as a cardiac stimulant and tonic, lessening the number of and increasing the force of the beats, and raising blood-pressure. The respirations are also reduced in number, but are deeper and more forcible. . . .

"When given subcutaneously there was some irritation at the point of injection, also more pronounced symptoms of pain. The effect was not seen as quickly, neither did the animal purge as freely. When given by mouth the effect was noted in from twenty minutes to fifty minutes. The animal purged more freely when given in a drench than when administered in a capsule. . . . The subcutaneous and intratracheal methods are unsatisfactory in doses that could be given with safety. The dose of the drug when given by the mouth should be two drams for a 1,000-pound horse, and fifteen grains should be added to this for each additional hundred pounds' weight. From the few experiments on cattle it would appear that the dosage in these animals must be larger than for a horse of the same weight. We would recommend thirty grains intravenously as the minimum dose for a 1,000-pound cow for mild purgative action."

The Behavior of the Leukocytes in Infection and Immunity I–IV. F. W. Andrews (*Lancet*, London, 1910, 1, No. 26, pp. 1737-1743; II, Nos. 1, pp. 8-16, figs. 5; 2, pp. 83-91, figs. 5; 3, pp. 153-158, fig. 1).—A series of four lectures on leukocytes delivered under the auspices of the Croonian lecture-fund.

The first lecture considers history, phagocytosis, humoral theories of immunity, opsonin theory, aggressin theory, etc. The second deals with the functions of the polynuclear leukocytes, the distribution of polynuclear leukocytes in the normal body, the circulating leukocytes, leukopenia, the phenomena of initial leukopenia, the initial polynuclear leukopenia as an immunity reaction, the mechanism of the leukopenia, the con-

stitutional symptoms associated with initial leukopenia, and the relation of leukopenia to anaphylaxis.

The third lecture includes initial leukopenia in the anaphylactic animal after injection of unorganized antigens, the effect of deep ether narcosis on anaphylactic shock and leukopenia, nature of the anaphylactic state, observations on immunity in the anaphylactic animal, the leukopenia of marrow exhaustion, spontaneous marrow-wasting in immunity, leukocytosis, the various types of polynuclear leukocytosis in infectious, early or initial leukocytosis and the leukocytosis of local tissue-infection. The author considers the leukopenia obtained after injecting intravenously living or dead bacteria an immunity reaction, and that it may be a part of the condition known as anaphylactic shock. He terms this phenomena "anaphylactic leukopenia."

The fourth lecture considers the bone-marrow in immunity, significance of leukoblastic reaction, the humoral factor, further observations on pyogenic infections, nonpyogenic infections, the varying nature of bodily defense against different bacteria, observations on harmless bacteria, pyogenic cocci, the tubercle bacillus, and Bacillus coli and its allies. In discussing the humoral factor the author protests against the exclusive importance attached to the value of determining the opsonic phenomena, as while it offers an easy method for estimating the general efficiency of the mechanism as a whole it is not correct to rely upon this factor as a sole index of immunity.

Book Reviews

Secrets of Specialists. By A. Dale Covey, M. D., Detroit, Michigan. This book is essentially an exposè of practically every system of quackery in regular medicine. The methods of the innumerable "specialists" and the formulæ they use are given. Its practical value to veterinarians lies chiefly in a number of excellent formulæ which are applicable in veterinary practice, e. g., Marsden's paste for the removal of cancerous growths, and in the department of nostrum formulæ, where are given the alleged formulæ of "Kendal's Spavin Cure," "Mexican Mustang Liniment," and some others which veterinarians' clients are often wont to look upon as something having remarkable curative powers. If a veterinarian is familiar with the composition of the nostrums used by his clients he is in a better position to discourage their use.

Published by the Physicians Drug News, Newark, N. J. Cloth bound, 330 pages, many illustrations. Price $3.50.

Feeds and Feeding. By Prof. W. A. Henry, Madison, Wisconsin, formerly Dean of Agriculture and Director of the Experiment Station of the University of Wisconsin. Tenth edition, revised and entirely rewritten, brought right down to date, and contains twelve percent more material than the preceding editions.

The need for a thorough knowledge of the science of feeding farm animals is being more and more recognized by veterinarians. As a knowl-

edge of pathology to be of any value must have for its foundation a knowledge of physiology, so any comprehensive knowledge of the proper feeding of sick and convalescent animals must be based upon a knowledge of feeds and of feeding of the normal animal.

Veterinarians engaged in contract work and those sought as advisers by stockmen, realize more than others the imperative need of expert knowledge of the science of feeding.

"Feeds and Feeding" is the recognized standard on this subject. It is the adopted textbook in more than thirty agricultural, veterinary and other colleges. No veterinarian engaged in general practice can afford to be without a copy of it. Its style is simple and entertaining; the subject matter is condensed and authoritative; the twenty-page index and the hundreds of cross references by paragraphs make all of its information instantly available. The physiology of digestion and nutrition is given in a thorough manner and cannot fail to be of direct value to veterinarians in their practice.

An idea of the scope of the work and its dealing with subjects may be gained from the sample paragraphs given below. The volume is divided into three parts.

PART I, 128 pages, shows how plants grow and elaborate food for animals—the composition of the animal body—digestion, and the energy of food—the function of food nutrients in the body—the production of flesh, fat, and energy—the various feeding standards—and calculating rations for farm animals.

8. *Plants Support Animal Life.*—Nature has decreed that it is the function of plants to build inorganic matter taken from earth and air into organic compounds, in which operation the sun energy employed becomes latent. Through the life processes the various plant compounds used as food by animals are, after more or less change, built into the animal body, or are broken down within it to give heat and energy. In this change and dissolution the sun energy which became latent or was hidden in the growing plant is again revealed in all the manifestations of animal life. In the coal burning in the grate we observe the reappearance of the energy of the sun which was stored in the plants of ages ago. In the stalks and ears of corn which we feed to our cattle we are furnishing energy received from the sun and rendered latent by the corn plant during the previous summer. Thus it is that the stockman, when supplying plants and seeds to the animals under his care, observes in their growing bodies, warmed by internal fires, the energy of the sun transmitted by the plant to the animal. To the plants of the farm the stockman turns for the nourishment and support of his animals. A general knowledge and full realization of how plants live and grow is therefore not only of interest, but also may be helpful in a thousand ways.

26. *Plants and Animals Compared.*—One of the great distinguishing differences between plants and animals is that in plants the walls of the cells of which they are composed are of carbohydrate material, while in animals the walls of the body cells are of protein substance. Thus plants are on a carbon and animals on a nitrogen foundation. The higher plants are nourished by inorganic matter, while animals live upon both organic and inorganic substances, principally the former. Plants absorb through their leaves great quantities of carbonic acid gas, composed of carbon and oxygen, retaining the carbon and giving off the oxygen as animals take free oxygen through their lungs and combine it with carbon to form carbonic acid gas, which is thrown off as waste in the breath. Thus the two great classes of living objects are interdependent.

In the animal body the organic material derived from plants may be built into still other highly organized compounds, usually protein in character. Thus built, matter has reached its last high stage of organized existence, but its fall or descent

soon occurs. In the daily waste of the body or upon the withdrawal of life, this highly endowed organic matter is quickly broken down into inorganic compounds, to begin again the eternal round of Nature.

37. *Special Provision for the Horse.*—The horse, though eating coarse food like the ox, has a small stomach and no paunch for specially preparing such food for digestion. In partial compensation it has the cæcum, which is a greatly enlarged protion of the alimentary tract, linking the small and large intestines. Into the cæcum is passed much of the undigested matter, together with the enszmes of the small intestine. Here the digestive process of the small intestine is prolonged, thus making up for his small stomach and lack of a paunch.

43. *Bacteria.*—In the stomach bacteria find unfavorable conditions for growth because of the free acid of the gastric juice, and in the small intestine the presence of bile rapidly causes the death of bacteria. Consequently bacteria play little or no part in digestion in either the acid stomach or the alkaline small intestine. They do act, however, on the woody fiber or cellulose in the first three stomachs of ruminants and in the cæcum of the horse. In the large intestine there develops a profuse bacterial flora of various forms which thrive in the absence of air. The presence of more or less undigested food, together with moisture, warmth, and the faint alkaline reaction, furnishes ideal conditions for bacterial growth. Some cellulose is decomposed by the bacteria with the liberation of carbon dioxide, marsh gas, and hydrogen. Sulphuretted hydrogen is also produced through putrefaction of protein substances. Some nitrogen is found, but this has its source in the air taken in with the food. Much of the gas is doubtless absorbed into the circulation and eliminated from the lungs. Products other than gas which are mostly toxic or poisonous to the animal result in small quantity from bacterial growth in the large intestine. To these substances the odor of the feces is largely due. If the functions of the bowels are impaired, the contents may remain for an undue length of time, in which case excessive putrefaction may cause the animal to suffer from poisoning due to the absorption of the products formed.

102. The table, which presents one side of a most complicated problem, shows that for 100 pounds of digestible nutrients consumed:

The cow yields about 139 pounds of milk, containing eighteen pounds of solids, practically all digestible.

The pig produces about twenty-five pounds of dressed carcass. Allowing for water, bone, and gristle, there remains over fifteen pounds of edible dry meat.

The steer and sheep yield less than ten pounds of dressed carcass, nearly half of which is water. Deducting this, and the bone and gristle, there remains only from two and three-fifths to three and one-fifth pounds of water-free, edible meat.

The cow easily leads all farm animals in her power to convert the crops of the field into human food, with the pig second, poultry following, and the steer and sheep coming lowest.

PART II, 122 pages, sets forth the feeding properties of substantially all the feeding stuffs used in America—the grains, mill and factory by-products, the grasses, hays, etc, soilage and silage—the preparation of feeds for animals, and the manurial value of feeding stuffs.

409. *Oats.*—No other grain is so keenly relished by the horse and so prized by horsemen as the oat, which serves as the standard of excellence for nourishing this animal. Not only are oats palatable, but the nutrients they contain are in such proportion that this grain alone forms almost a balanced ration. Though the oat hull has little nutritive value, it lightens up the feed, giving bulk and lessening possible errors in administering the ration too liberally. The digestive tract cannot hold such a quantity of oats as will ordinarily produce serious troubles from gorging. Because of their universal favor and the wide demand for them, oats are rarely an economical grain, but where expense is not a prime factor they easily hold first place. Only hard-worked horses and those with poor teeth need have their oats ground. New and musty oats should be avoided. A safe rule is one quart or pound of oats for each 100 pounds of horse—more for the hard-worked and less for the idle.

168. The mettle or spirited action so characteristic of the oat-fed horse is never quite attained through the use of any other feed. It has long been held that there is a stimulating principle in the oat grain, and though all claims of the discovery of this principle have melted away on careful examination, there yet remains the feeling that there is a basis for the claim.

PART III, 302 pages, presents in carefully arranged, condensed form, illustrated by numerous tables, substantially all the typical and more important findings of the European and American experiment stations bearing on the rational feeding of the horse, cow, calf, steer, and pig.

387. *Period of Gestation.*—According to Youatt ("The Horse," p. 222), the average period of gestation for the mare is eleven months, but it may be diminished by five weeks or extended six weeks. Of 582 mares reported by M. Tessier ("Farmer's Cyc.," Johnson, p. 562) the shortest period was 287, the longest 419, and the average 330 days. William Russell Allen of Allen Farm, Pittsfield, Massachusetts, from records of 1,071 foals produced by trotting mares during fifteen years, found the maximum gestation period 373, the minimum 319, and the average 340 days.

389. It is shown that mare's milk contains more water and only about one-half as much casein, albumen, and ash as cow's milk, while the sugar is nearly one percent higher (595). It is white or bluish in color and has an aromatic, sweetish, slightly bitter taste. According to Fleishmann ("Lehrb. d. Milchwirtschaft," 1901, p. 65) Tartarian mares sometimes remain in milk for two years, producing 440 to 490 pounds of milk annually in addition to that required by their foals. Vieth (Landw. Vers. Stat., 31, 1885, p. 354) reports that good Russian milking mares, when milked five times a day as is the practice, yield four to five quarts of milk daily.

When it becomes necessary to rear foals on cow's milk, it should be diluted with water, and sugar added, the Peterson and Höfker (*Milch. Ztg.*, 26, 1897, p. 647) question the advisability of adding sugar.

457. *Raising the Orphan.*—Johnstone ("The Horse Book") gives the following on feeding the orphan foal: "Get the milk of as fresh a cow as possible, and the poorer the butter fat, the better. . . . Take a dessertspoonful of the best granulated white sugar and add enough warm water to dissolve it. Then add three tablespoonfuls of lime water and enough new milk to make a pint. Get an old teapot and scald it thoroughly. Over the spout tie securely the thumb of an old kid glove, and with a darning needle pierce holes in the kid. Warm the milk to blood heat, pour a part of it into the teapot, and when it flows through the spout into the thumb, an excellent imitation of the maternal teat will be formed, which the foal will suck promptly. Let him have half a teacup full every hour at first. It is a bothersome chore, but it must be done."

389. Lime water is helpful at all times, and castor oil may be used in checking the scours which so frequently trouble hand-fed foals. The quantity of diluted milk should be increased with the growing needs of the animal, and gradually full milk substituted. Gruels made by boiling peas and beans and removing the skins by passing the pulp through a sieve are helpful, as is the jelly made by boiling linseed oil meal. Cooked wheat middlings or low-grade flour may also be used. As Johnstone says: "The rearing of a motherless foal is mostly in the man or woman who essays the job."

461.—"The point to be aimed at in the stable management of the stallion is so to feed, groom, and exercise as to keep the horse to the very highest possible pitch of strength and vigor. The idea which prevails among many stable grooms that feeding this or that nostrum will increase the ability of a horse to get foals is sheer nonsense. Anything that adds to the health, strength, and vigor of the horse will increase his virility or sexual power, simply because the sexual organs will partake of the general tone of the system; and on the contrary, whatever tends to impair the health and vigor of the general system will have a deleterious effect upon the sexual organs. A healthy horse needs nothing but good food, pure air, plenty of exercise, with due attention to cleanliness and regularity in feeding and watering; and when all these things are attended to properly, the drugs and nostrums that stable lore prescribes as 'good for a horse' would be better thrown to the dogs."

588. *Gestation Period.*—Wing, of the New York (Cornell) Station (Bul. 162) found the average of 182 recorded gestation periods for the cow to be 280 days, ranging from 464 to 296 days. About an equal number of births occurred on each day from the 274th to the 287th inclusive. The period was not different for the sexes.

613. Studies at the Wisconsin Station (Rpt. 1905) show that subjecting cows to the tuberculin test has practically no effect on the yield of milk and butter fat.

The Appendix Tables, covering 29 pages of figures, show the composition of substantially all American feed stuffs and their digestible nutriments.

"Feeds and Feeding" is a large octavo volume of more than 600 pages, bound in cloth; price $2.25 prepaid. May be obtained of the author or from this office.

Opinions on Many Topics by Readers of

"Veterinary Medicine"

Uncommon Cases

Case 1. I was called to a neighboring town to attend a thirty-six-hour-old colt suffering from colic. Shortly after this colt was foaled, owner noticed a hemorrhage from its navel which he tied several times before stopping it. The colt appearing alright until an hour before I was called.

I found animal suffering intensely and struggling violently. I gave sedatives and a rectal injection which removed two or three hard balls of fecal matter.

The sedatives seemed to have no effect for longer than a few minutes. I continued giving them until I had given enough for a full-grown horse; also applied moist heat to abdomen. After continuing this treatment for about three hours, the colt would apparently become unconscious for three or four minutes, and then would begin to struggle violently again. It died in about eight hours.

Case 2. This colt was twenty-four hours old. I was called to attend to its navel, which was leaking, so the owner said. This being done, I returned home, to be called back again in a couple of hours, when I found the colt acting the same as colt No. 1 had acted. I gave the same treatment, also catheterized it; it was a male. This colt lived about the same length of time as did the other The sedatives did not have any better effect on it than on the first one. I posted this one, and found the intestines congested and much peritonitis, but the most extraordinary part of it was the condition of the pancreas, which was three times its natural size, very dark, and so full of dark blood and pus that it was near to bursting. Being, I should judge, a case of suppurative pancreatitis. The infection must have occurred during the intra-uterine period, as this condition could not have developed in twenty-four hours.

H. FAIRFIELD, M. D. V.
Chalmers, Ind.

Acites

August 2, 1910, a farmer brought to my office a large setter. About two weeks before this a two-year-old colt ran over the dog and kicked him. No ill effects were noticeable at the time, but after three or four days he appeared sluggish and would not respond when called. In about seven days there was an enlargement of the entire abdomen, but no pain.

Upon examination I found the abdomen distended and respiration labored; the patient would not lie down. I passed a trocar into the abdomen, but failed to get any

liquid and consequently decided to operate on him.

After the usual antiseptic precautions I made an incision two inches long extending back from the umbilicus, but found no liquid, so extended the opening a couple of inches further and on spreading the walls of the incision apart I found a fibrinous tissue covering all the intestines. A straw-colored liquid to the amount of a gallon and a half was liberated on breaking through this fibrinous tissue. The mesenteries were covered with small, hard, white cysts of the size of a pea. At the base of the liver there was a large blood-clot the size of an egg and a small abscess which contained watery pus, the right lobe of the liver was covered with the small cysts.

I washed out the cavity with a weak solution of eucamphol, sutured the incision and let the owner take the dog home with him with instructions to feed him a light diet, see to it that his bowels were regular and to give him light exercise.

September 1 the dog was brought back to me. He had begun to fill up again; I passed the trocar but failed as before to get any liquid. I had the dog left with me and gave the following:

℞ Pulverized squill, pulverized digitalis, solid extract of hyoscyamus, and calomel, of each one grain. M. et ft. pil.

Sig.: One of these pills night and morning for seven days, and one of them each morning for two weeks longer. At that time the ascites had disappeared and the dog seemed to have made a fair recovery, but in working in the field all day he seems sluggish at night. Is there any better treatment than what I have been giving?

CHAS. BYERLEY, D. V. S.

Topeka, Kan.

Parturient Paresis and Deglutition Pneumonia

Case 1. This may be of interest to some; it was to me, and it serves in a way to answer Dr. D. O. Knisely's question pertaining to parturient paresis, and to illustrate the answer by another veterinarian in the October issue of VETERINARY MEDICINE. It also gives the exact time that pneumonia stages were noticed.

At five p. m. a fat cow was seen staggering as she left the stalkfield for home. She fell in her stall on arrival. All the neighbors were consulted first, as usual, and after their unfailing remedies had proven ineffectual, the owner was advised to get such and such an empiric. This was done, and a quart of a solution of epsom salt was administered to the unconscious cow while lying broadsided at six p. m. As time went on things grew worse. At midnight I was called and found the animal lying flat with a rattling in the trachea and some frothy exudate was noticeable on the ground. "Has this animal been given any medicine?" I asked. In reply I was told, "only a pound of salt to move the bowels." "Well," I remarked, "I am sorry to learn that, for it may cost you the value of the family cow." Explanations followed, but I proceeded to earn my money. The udder was inflated,

a hypodermic injection of one-half grain strychnine was given, the urine was drawn, and she was supported on her brisket by bales of straw. An hour and a half later twitching of the gluteal muscles and at the flank was beginning. Eructations of gas from rumen had started and were growing more frequent. The eyes were brightening, next the ears were noticed to move voluntarily and a small bowel movement soon occurred. At two a. m. she made an attempt to rise, but sank back. At this movement the twenty-four-hour old calf sprang up and she took cognizance of it in the usual manner. I was well pleased with the progress and was thinking inwardly I might have to swallow my early prognosis by saying the drench must have gone to her rumen.

The owner evidently felt I was mistaken also and suggested some hot coffee and a good warming by the stove, to which I readily consented. Half an hour elapsed, and again we were with our patient. The owner was still jubilant, but not I. There was a violent quivering of the fore arms, croup and in fact the whole body that to me indicated congestive chill or an engorgement of blood in the lungs, due to the mechanical irritation produced by the epsom salt administered nine hours before. Accelerated breathing and a grunt at each expiration were now in evidence for the first time since the attempt to rise at two a. m., and as time went on more misery followed. I felt discouraged, but still hoped my prognosis might be wrong. As she was not yet up I repeated the milk-fever treatment at three o'clock and left her in care of the owner. At ten a. m. she got up unaided and stayed up two hours.

I saw her at twelve o'clock, noon, of the same day, standing. Her nose was held three inches from the floor and between her fore legs, her eyes watery, muzzle dry, and she was grunting with each expiration. The case was plain. She lived twenty-four hours longer and was buried by the local skinner for hide and tallow, and he relates this: The owner, still a "doubting Thomas," asked to see the thorax opened. This convinced him and he said "it looked like she had two livers instead of one."

A spike seven inches long was incidentally picked out of the contents of her rumen.

Would the nuclein treatment for deglutition pneumonia from oil have saved this cow?

Case 2. Asphyxia of hog. In speaking of deglutition pneumonia of the ox and pointing out the mistakes of others it is only honest to acknowledge my own. I was asked to see a bunch of seven hogs all being sick, and one having died after a three-weeks' illness. The one just dead showed diarrhea prior to death, another showed paralysis (paraplegia), a third purple staining behind the elbows on the abdomen. I suspected hog cholera; the dead one having been buried some days before I was consulted, I had no chance to hold an autopsy to make sure—still all were too sick to eat.

I decided to try the Abbott sulphocarbolates compound and the owner quickly picked up a 100-

pound shote by the ears and settling him on his haunches I forthwith administered some magnesium sulphate solution through a hose a foot long and a two-ounce dose syringe and followed this with a dose of the sulphocarbolates. The next day the owner and I tried the same treatment on two others, but I got disgusted with their squealing and the rubber hose, so threw it away and used just the long-nozzled two-ounce syringe and filled their mouths slowly. They gargled it for a minute or two in each case and swallowed, but in less than fifteen minutes both were dead as a mackerel.

It is easily seen that lack of experience in the hog line can get one into trouble. I'll stick to the rubber hose for hogs the next time.

M. L. HYNES.

Rantone, Ill.

Chloral Satisfactory

By way of comment on the article "Local and Hypodermic Anesthesia" in the November issue of VETERINARY MEDICINE, I wish to endorse heartily the Editor's note regarding the use of chloral hydrate intraperitoneally.

We have repeatedly used this form of anesthesia and without detrimental results. The most pleasing effects are, possibly, enjoyed by the country practitioner, who has not a retinue of trained assistants and is often compelled to enjoy the use of a manure pile as an operating table. The following report of a case of transverse fracture of the os meta-tarsus magnus will illustrate my use of this anesthetic.

Bay mare, twelve years old, sustained simple transverse fracture of the right os meta-tarsus magnus, at about the juncture of the lower and middle third of the bone. A small cutaneous wound also present on external side of leg.

At time of injury professional aid was not employed but a dressing with wooden splints was applied by the owner. Three days after the injury the case came to the hands of the writer. The splints which had been applied, while preventing the pendulant motion which otherwise would have been present, were very unsatisfactory.

A plaster cast was applied extending from the hoof to the hock, with patient standing and partially under the influence of H-M-C. At the completion of the cast and before it had "set," the patient became very restless, finally throwing herself. While this cast was not satisfactory, it was allowed to remain one week, at which time the case was brought to our hospital. The cast was now loose and allowed some motion at the seat of the fracture.

The patient was placed at the side of an operating table and an intraperitoneal injection of chloral administered. The table was not turned down until the anesthetic had taken effect, thus preventing the struggling which would otherwise have occurred.

The old cast was removed; examination showed no union of the injured bones and a moderate amount of swelling.

A new cast was applied, extending from the hoof to about six or eight inches above the hock. A "window" was arranged to permit dressing the cutaneous wound. The patient remained under the anesthetic until the completion of the cast and until it had thoroughly "set."

Here the prolonged effect of the chloral proved very beneficial.

The patient was allowed her freedom in a small paddock and received no further treatment, except dressing the wound through the "window" followed by the application of a compression dressing to prevent swelling at this point. At the end of three weeks the wound had healed.

Eight weeks after its application the cast was removed. The fracture had made a nice union. In a few days the patient was walking fairly well and at the time of writing this is showing marked improvement.

The benefit of the cast running so far above the hock is two-fold:

a) Complete immobilization of the two segments of bone.

b) Prevention of flexion of the limb, which is so annoying and detrimental in many cases.

This case is not cited to give expression to any new or original technique, but is of interest on account of the time elapsing between the occurrence of the injury and the application of a permanent cast.

We cannot confirm the essayist's experience that quinine and urea hydrochloride is not irritating. While our experience has been limited, the use of this product in a one-percent solution for diagnostic purposes has sometimes been embarrassing, as at different times it has produced considerable irritation with its resultant phenomena.

B. H. EDGINGTON, M. D. C.
Mt. Sterling, O.

An Unusual Case

On Friday morning, October 28, I was called to the country to see a colt. Upon arriving I found the colt down, stretched out and unable to rise.

Description.—A well-developed percheron colt, five months of age.

History.—Had always been well with the exception of an infected navel when a few weeks old. Was seen the evening before by the owner, and was apparently all right. Had not been fed any grain and had been running on clover meadow for two weeks just preceding his sickness.

Symptoms.—Temperature normal. Pulse weak and fast. Paralysis of both posterior limbs. Slight swelling over surface of loins. Urine thick and coffee-colored. Contents of bowels were normal, but he was unable to defecate. Quiet at times, delirious at others. Was sweating freely.

Diagnosis.—After a careful examination of patient and a deep inquiry into the history, my diagnosis was azoturia.

Treatment.—I ordered the patient to be left where he was. Had him bedded freely. Put hobbles on fore limbs. Advised the owner to turn him every four hours. Allowed him to have all the

warm water containing acetate potassium that he wanted. Applied hot packs over surface of loins and hips. Had them changed every hour. Gave warm water injections and removed the feces from rectum.

Medication.—Gave a cathartic consisting chiefly of aloes. Pilocarpine hydrochloride hypodermically to produce copious sweating. One dram of adrenalin chloride solution was administered per oram every three hours. Fluid extract of gelsemium to control delirium. When I arrived the following morning, the colt was able to get up without any assistance, but was very unsteady in his gait. He improved steadily, and made a complete recovery in a few days.

As this is an unusual case, I shall be pleased to have opinions of readers as to the correctness of my diagnosis.

E. L. BAKER, M. D. C.

Oneida, Ill.

Tuberculosis in a Mare

October 18, I was called to see a lame bay mare about seven years old. The owner said she had been lame for two or three weeks. I diagnosed the case "lameness in the right shoulder," which was all the trouble I could observe and I treated it accordingly. On November 6 I was called again, and found she walked about as well on one fore leg as on the other, but she seemed to be lame in both hind legs, and was standing first on one hind foot and then on the other. She walked stiffly, had some fever, the respiration was somewhat accelerated. I said, "It acts like rheumatism today." So I gave her a cathartic, which acted. Then I sent medicine for rheumatism. I mentioned, however, that the right shoulder lameness might come from a disordered liver.

I heard from her every day by telephone. She would not eat the medicine in the feed, so was drenched. Later it was reported she would not eat. "Well," I said, "if she won't eat, she will die, and when she does I want to be informed, as I wish to hold an autopsy, and see what is the matter with her liver and spleen." On November 10 I received a telephone message that she had gone to her reward, if she had a reward coming. I drove out and told them before I cut her open, that I expected to find an enlarged liver and spleen. But, I never mentioned tuberculosis, for I saw nothing to indicate it. I removed the spleen, which weighed thirty pounds and was thickly studded with tubercles; the owner looked amazed, and so did I. Then I went after the liver, which weighed forty pounds, but was affected only in the miliary form. One lung was full of tubercles, but they were small and thickest in the posterior lobe with no broken-down tissue. The mare had no cough. Now, if this was not tuberculosis, what was it?

GEO. M. WALROD.

Storm Lake, Ia.

—

[Might not these tubercles have been due to a parasitic invasion of the organs affected. What have others to say on the subject?—ED.]

Wanted—A Diagnosis

A sorrel colt one year old, weight 735 pounds, has a good appetite and while in the stable everything is apparently normal.

If the colt is taken to the pasture, in a short time there is a great swelling on both sides of head at carotid region. These swellings remain until colt is taken into stable, when in a short time they disappear and everything returns to normal.

There is no sign of any discharge either while the colt is at pasture or while in the stable.

I will appreciate very much a discussion as to the diagnosis, prognosis and treatment.

J. H. SWEENEY, D. V. S.
Norfolk, Va.

A Diagnosis for "T. C., Canada"

Referring to the paragraph "Wanted, a Diagnosis" (page 324, November issue of VETERINARY MEDICINE), I will say that in thirty years of country practice I have come in contact with two cases having the same symptoms, the first one I did not name for several days after I was sure it was not azoturia. I kept the animal at the hospital a week. The diagnosis was embolism; the autopsy proved it correct.

The other case was traded after I told the owner my opinion. He was driven about a quarter of a mile at a slow gait, but he fell down; after a short time he got up and was led behind the wagon, but when he had trotted about forty rods he fell again. He was destroyed at once and no autopsy held.

O. L. RICE, V. S.
North Brookfield, Mass.

A Diagnosis

"T. C." of Canada wants a diagnosis of a case he describes in the November issue of VETERINARY MEDICINE, page 324. I am quite sure it is a case of thrombosis.

In my own experience I have seen a blockey mare in fine condition and very gentle driven three or four blocks and become very lame in one hind leg. An attempt was made to return her to the barn, but before reaching it she was so lame she could not stand. I succeeded in getting her to the barn after several trials. She would eat and seemed as hearty as ever, but if moved rapidly a block or so she would get lame and fall and, after a few minutes, get on her feet again. On examination per rectum after trotting her a little I found a thumping in the external iliac artery supplying the lame leg. Hence the diagnosis.

D. D. KEELER, V. S.
Salem, Oreg.

Fare Thee Well

[Prof. Metchnikoff recommends the removal of the large intestine as a means of prolonging life.]

Fare thee well! And if forever,
Large intestine, fare thee well!
Metchnikoff declares that I can
Do without thee just as well.
Furthermore, he says, without thee,
I shall live a longer life—
Hurry with the anesthetic,
Hasten with the carving knife!

Soon, O useless large intestine,
Where the germ of age doth grow,
You may meet with the appendix
That I lost some time ago.
In the wondrous realm of science
Such astounding things befall—
Soon it may become the fashion
To have no inside at all.

—*Physicians' Chem. and Drug Journal. Chicago.*

Disinfection of the Skin by Tincture of Iodine

Noferi after a considerable experience of Grössich's method of disinfecting the skin by tincture of iodine, strongly recommends it in surgical work. The method is of the simplest, and is not only effectual from the disinfectant point of view, but saves time and some of the inconveniences of the common method of disinfection by soap and alcohol. The author believes that by the latter method some of the germs lying deeper in the skin are necessarily disturbed, but patients are apt to be chilled by the prolonged ablution and dermatitis set up by the scrubbing. In cases where no urgency of operation is indicated, the Grössich method is as follows: The day before operation the patient is shaved and has an ordinary bath; no preliminary disinfection by ordinary methods or with iodine is used, and no sterilized dressings or bandages applied. Ten minutes before operation, and whilst the surgeon is finishing the disinfection of his hands, the assistant paints the operation area with two coats of tincture of iodine on a swab of aseptic gauze. When the operation is finished, another coat of iodine is given along the line of sutures, and finally a third painting on the eighth or ninth day, when the sutures are removed. The author speaks very favorably of his method, and as in his clinic there are over 2,000 major and minor operations in the year, the experience is sufficiently ample to judge of the value of any given method. A slight advantage gained by his method is this, namely, that the brown coloration enables the surgeon to see exactly how far the disinfection has been carried out.

—*British Medical Journal.*

Antiseptic vs. Germicide

Since germs have been discovered and determined to be the cause of various morbid conditions, many new terms have arisen in the literature of the subject. Some of these have answered for temporary use until more accurate terms were found to take a permanent place in our language.

In accurately differentiating between terms we have yet to become accustomed to the exact meanings of the words antiseptic and germicide. Heretofore they have been used interchangeably as if they were synonymous.

If we are to be more exact in our language in the future we must limit the word germicide to those agents or processes which definitely destroy or kill disease germs. Nothing less than that will comply with the meaning of the term. It is doubtful if we have any agent which is capable of doing this which is safe to use in or on the human body. The two standard agents referred to when this term is used have been carbolic acid and bichloride of mercury; although in the strength in which they are required for this action they are far too poisonous for use.

For example, according to a report of the Council on Pharmacy and Chemistry of the American Medical Association, a 1 to 5,000 solution of bichloride of mercury does not kill the staphylococcus pyogenes aureus in five minutes' contact.

That is, it is not germicidal in that strength in that length of time; yet it is highly poisonous to the individual if kept in contact with an absorbing surface for that length of time. We have in the past few months published several articles calling attention to the injurious effects of bichloride when used as a local antiseptic.

The dangerous effects of carbolic acid are so well known that we need hardly refer to it here. The following extracts from Hare's "Therapeutics" will show how the question is viewed in recent literature:

"A large number of cases are on record in which carbolic acid poisoning ensued from absorption from surgical dressings."

"When iodoform is absorbed by the stomach or skin from surgical dressings, it induces a train of serious and curious symptoms."

"Bichloride of mercury, even in this dilute lotion (1 : 10,000), has, when used in the peritoneal cavity, given rise to toxic symptoms."

"Koch stated that where albumen was present, bichloride was decomposed and rendered inert."

An agent may be markedly antiseptic, that is, it may inhibit the growth of disease germs, without being specifically germicidal and without being injurious to the human organism. A recent report from the Council on Pharmacy and Chemistry shows us that chinosol is such an agent to a very high degree. According to the report of the Council, chinosol forms no precipitate in any dilution, while carbolic acid forms a slight precipitate in dilutions of 1 to 100 and 1 to 200, and mercuric chloride forms a heavy precipitate in all dilutions up to 1 to 1,000, and a less heavy precipitate in 1 to 5,000. The report of the Council shows that chinosol is an efficient antiseptic and yet is not poisonous. Neither is it irritating or caustic to the skin or mucous membrane. In fact, it is an ideal antiseptic agent.

Years ago we used a solution of chloride of ammonium as a lotion in minor surgery. It was not germicidal, yet it was highly antiseptic and excellent results were obtained with it. However, it was so irritating that we finally quit using it. Let us bear in mind the difference between a germicide and an antiseptic.—*Medical Council.*

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R. B. PLAGEMAN, D. V. S.
Brooklyn, N. Y.

A Treatment for Mange

I was called to see a pointer pup that had been sent to the country to be broken, etc. The owner went to the country one day to see him, and to his surprise found the dog so weak as to be unable to stand; it had the worst case of mange I ever saw, extending from head to tail. The back was entirely raw. The owner asked me to do something for it. I prescribed:

℞

Thigenol	oz. 1
Salicylic acid	oz. 1
Petrolatum	ozs. 3

M. et ft. ungt.

Sig.: After washing the dog with tyroline, five-percent solution, apply unguentum, and repeat in three days.

This was done about two weeks ago, and the pup today is lively as a cricket, weighs ten or twelve pounds more than he did when I first saw him and the patches are all healing over and being covered with new hair. This happy termination was unexpectedly prompt considering the severity of the case. I was more than pleased by it.

J. H. SWEENEY, D. V. S.
Suffolk, Va.

Spavin

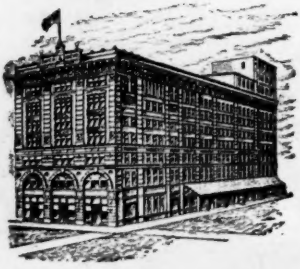
One year ago I applied Antiperiostin to a large bone spavin of one year's standing in a four-year-old mule that was very lame. The lameness disappeared in ten days. A very heavy stiff scab formed over the exostosis and remained there four weeks and then dropped off. Results: spavin was all gone; lameness all gone. This mule has since worked hard all summer and remains sound. It looks good, doesn't it?

J. A. DRESBACH.
Stanberry, Mo.

Cat and Dog Waifs to Have Real Home

Chicago's society women pledge themselves to raise a fund of $20,000 for a home for the city's dog and cat "hobos". The palatial hostelry is to be constructed, or purchased if a suitable place can be found, somewhere in the vicinity of Chicago avenue and the Lake Shore Drive or Rush street, far from the business district, where the human tramp begs the city for a night's lodging. Subscriptions to the amount of $8,000 are said to have already been secured.

—*Chicago Record-Herald.*



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